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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/691,761	10/23/2003	Jeffrey A. Nielsen	200309747-1	6690

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EXAMINER
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LAMBELET, LAWRENCE EMILE

ART UNIT	PAPER NUMBER
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1732

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/23/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

5

<b>Office Action Summary</b>	<b>Application No.</b> 10/691,761	<b>Applicant(s)</b> NIELSEN ET AL.	
	<b>Examiner</b> Lawrence Lambelet	<b>Art Unit</b> 1732	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 30 November 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Response to Amendment*

Applicant's amendment filed on 11/30/2006 is acknowledged. Amended claims 1, 5 and 7 are placed of record in the file. Claims 1-9 are pending for examination.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Crawford (U.S. Patent 6,936,212), and further in view of Jang et al (U.S. Patent 6,401,002).

Crawford discloses a method of producing a three-dimensional object, as recited in claim 1. Crawford teaches a selective deposition modeling (SDM) process wherein a shell structure (shell layer) and an internal lattice (interior layer) are differentiated in layer formation, as shown in the Abstract. Further, the formation of layers is scripted by computer data (criteria) as shown at lines 44-53 in column 3. Referring to Fig. 4 and the text passage at lines 35-48 in column 7, it can be shown that layers consisting only of shell (partial) and other layers consisting of both shell and interior (complete) are combined in a stack configuration according to scripting, and that the base layer and another layer following a shell and interior combo layer are shell only in composition.

Art Unit: 1732

Crawford further teaches that a planarizer is used to normalize layers at lines 38-43 in column 10.

Crawford does not teach that the interior layer is a solid layer within the shell layer, as required by claim 1.

Jang et al, hereinafter "Jang", teaches that exterior regions (shell layer) are differentiated from interior regions in a deposition process providing a filled (solid) layer. See lines 3-15 in column 7.

Crawford and Jang are combinable because they are concerned with a similar technical field, namely, SDM. One of ordinary skill in the art at the time of the invention would have found it obvious to include the independent regional depositions as taught by Jang in the modeling method of Crawford. The motivation to do so would have been improve building speed by increasing flow rates. See lines 13-16 in column 7 of Jang.

Claims 2-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Crawford in view of Jang as applied to claim 1 above, and further in view Kerekes (U.S. Patent 6,492,651).

Crawford/Jang teaches the method of claim 1, as discussed above.

Crawford/Jang does not teach monitoring waste and modifying criteria, as required by claims 2 and 7, or modifying through the determination of height criteria, as required by claim 3. Crawford further does not teach calibration criteria based on average heights of shell and interior layers, as required by claim 4.

Kerekes teaches monitoring height data across a layer surface to determine low areas and provide modification to criteria through feedback data. This is shown at lines 9-17 in column 4. The result of this feedback is to avoid depositing material which would be wasted in any normalization process. In this way, monitoring height data constitutes a waste monitoring process.

Kerekes teaches that sample points are used to represent an area or region at lines 14-57 in column 7. These sample points, illustrated by reference characters (26) and (32) in Fig. 3, can be said to represent the average height of a contiguous region. Such sample points can be combined into broader regional averages, and averages representing shell and interior regions can be compared. In effect, the process steps (16) and (18) in Fig. 2 translate such a comparison into calibration criteria directing new deposition of material in a closed loop manner. It would have been obvious to one of ordinary skill that the result would be the same as an open loop calculation, such as that of the instant claim 4, based on the same measurement data.

Crawford/Jang and Kerekes are combinable because they are concerned with a similar technical field, namely, SDM. One of ordinary skill in the art at the time of the invention would have found it obvious to include in the method of Crawford/Jang the monitoring process of Kerekes, and would have been motivated to do so to decrease the build time by eliminating excess deposit of material.

Crawford/Jang does not teach selective deposition of interior voxels, or different combinations of voxels by layer, as required by claims 5 and 9. Crawford/Jang further does not teach less than 100% of interior voxels for each layer, as required by claim 6.

Art Unit: 1732

Kerekes teaches that layer-by-layer feedback is provided based on height data to selectively deposit new build material. This is shown at lines 24-45 and 65-67 in column 3, 1-2 and 63-65 in column 4, 1-13 and 35-57 in column 7, 48-64 in column 10, in the Abstract, and in claim 1 of the reference. Because of the dimensional variability in the build, and because the method is directed to detecting and filling low spots, it is evident that different combinations of interior voxels will be applied to each layer. Such variability is discussed at lines 49-54 in column 1. Kerekes further teaches that layers will be partially provisioned (less than 100% of the interior voxels) according to feedback data as shown at lines 10-17 in column 4.

One of ordinary skill in the art at the time of the invention would have found it obvious to include in the method of Crawford/Jang the discrete deposition technique of Kerekes, and would have been motivated to do so to save material.

Crawford/Jang teaches the method of forming and planing, as required by claim 8. The discussion regarding this is the same as that for claim 1 above.

### ***Response to Arguments***

Applicant's arguments with respect to amended claims 1, 5 and 7 have been considered but are moot in view of the new ground(s) of rejection.

With regard to Kerekes, applicant argues that height monitoring is unrelated to waste monitoring.

Examiner respectfully differs. The height data points across a layer form a computational model that would represent the amount of material that would normally

Art Unit: 1732

be removed from the layer (waste) in layer-leveling process. See lines 1-5 in column 2 and 23-25 in column 3. Instead of removing material, Kerekes simply fills out the layer with additional material to normalize it. Since the end result is the same as the instant process, it would have been prima facie obvious to one of ordinary skill that the methods were equivalent.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lawrence Lambelet whose telephone number is 571-272-1713. The examiner can normally be reached on 8 am-4:30 pm.

Art Unit: 1732

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on 571-272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LEL  
2/12/2007

  
CHRISTINA JOHNSON  
SUPERVISORY PATENT EXAMINER

2/20/07